

# Hydrophobic Polymers with Adherend Complexing Sidechains as Durable Aerospace Adhesives, Phase I

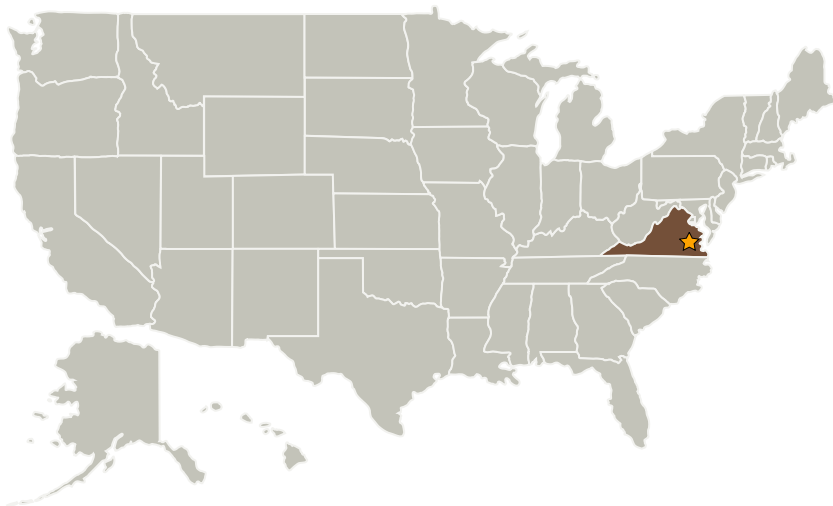
Completed Technology Project (2009 - 2009)



## Project Introduction

In support of NASA's Aeronautics Research Mission Directorate, NanoSonic would optimize our moisture-resistant aerospace adhesives with in-situ corrosion mitigating surface treatments to improve aviation safety by reducing durability related hazards on subsonic commercial aircraft. NanoSonic specializes in the production of advanced, non-commodity resins as adhesive, sealant, and novel coupling agents. One aspect of our synthetic method involves the systematic replacement of nonpolar groups along well defined polymer backbones with sidechain chemical moieties capable of complexing with metals, hence significantly increasing adhesion to metal or composites relative to nonpolar resins. Synthetically engineered hybrid copolymers allow the inherently hydrophobic backbone to mitigate moisture ingress, while the tailored sidechain moieties offer adhesion orders of magnitude greater than unmodified commodity resins. NanoSonic also tailors the number and type of crosslinking sites available to minimize CTE, while maximizing the mechanical properties and cohesive strength to prevent catastrophic disbonding from aircraft adherend. The specialty adhesives are available in 1-55 gallon drum quantities. Down-selected adhesives and coupling agents shall be tested under harsh thermal (-90°F to 800°F) and environmental conditions and in a wind tunnel (subsonic, Mach <1) along-side state-of-the-art structural aerospace adhesives to increase the TRL from 4 to 6 during Phase I.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Langley Research Center (LaRC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center (LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Nanosonic, Inc.	Supporting Organization	Industry	Pembroke, Virginia

## Primary U.S. Work Locations

Virginia

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX04 Robotic Systems
  - └ TX04.5 Autonomous Rendezvous and Docking
    - └ TX04.5.5 Capture Mechanisms and Fixtures